

## Appendix



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### Abbreviations, Explanations

Term	Meaning	Explanation
<b>1</b>		
<b>10 Gigabit Ethernet</b>	—	Standard for 10 Gbit/s data transfer using fiber-optic and copper cables
<b>1000BaseT</b>	—	Gigabit Ethernet; standard for 1 000 Mbit/s data transfer on copper cables
<b>100BaseFX</b>	—	Fast Ethernet Standard for data transmission on glass fiber-optic cables
<b>100BaseT</b>	—	Fast Ethernet Standard
<b>10Base2</b>	—	Standard for the transmission of 10 Mbit/s Ethernet on thin coaxial cables; segment length: 185 m
<b>10Base5</b>	—	Standard for the transmission of 10 Mbit/s Ethernet on coaxial cables (yellow cable); segment length: 500 m
<b>10BaseFL</b>	—	Standard for the transmission of 10 Mbit/s Ethernet on glass fiber-optic cables (fiber link)
<b>10BaseT</b>	—	Standard for the transmission of 10 Mbit/s Ethernet on twisted-pair cables
<b>2, 3, 4</b>		
<b>2G</b>	—	Second-generation mobile radio standard (see also GSM/GPRS) as digital successor to analog mobile radio systems
<b>2.5G</b>	—	Extension of the second-generation mobile radio standard for higher bit rates (see also EGPRS)
<b>3G</b>	—	Third-generation mobile radio standard (see also UMTS) with significantly higher data transmission rates and global availability
<b>4G</b>	—	Fourth-generation mobile radio standard (see also LTE) as successor to 3G/UMTS with high data transmission rate
<b>A</b>		
<b>Access point</b>	—	Access Points enable wireless LANs to be connected to wired Ethernet networks. The device also enables the range of individual wireless LAN components to be extended.
<b>ACL</b>	Access Control List	List with MAC addresses that are authorized to access the radio network
<b>Actuator</b>	—	Actuator
<b>Ad-hoc network</b>	—	Radio network between two WLAN clients or terminals (e.g. laptops) (point-to-point)
<b>AES</b>	Advanced Encryption Standard	Powerful encryption mechanism in radio networks for protection against eavesdropping and unauthorized access
<b>ALI</b>	Application Layer Interface	Interface to application layer; this forms the interface between an application process and the standardized interface of the application layer and vice versa.
<b>Antenna diversity</b>	—	Procedure in which a radio receiver is equipped with two antennas and can choose the better of two received signals
<b>Antenna gain</b>	—	Improvement (passive!) of the antenna due to suitable design in comparison with an isotropic radiator
<b>AP</b>	Automation Protocol	Automation Protocol Layers 5 through 7 of the ISO reference model
<b>ASIC</b>	Application Specific Integrated Circuit	Application-specific IC
<b>AS-Interface</b>	Actuator-sensor interface	Cable for direct connection of simple binary sensors and actuators (transmission of small quantities of information)
<b>ATEX</b>	—	Approval for explosion-proof areas
<b>ATM</b>	Asynchronous Transfer Mode	Method by which the data traffic is transmitted in smaller packets of fixed length and by means of asynchronous time division multiplexing
<b>AUI</b>	Attachment Unit Interface	Interface compliant with IEEE 802.3
<b>Autocrossover</b>	—	Function that enables automatic crossover of send and receive cables at twisted pair interfaces.

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<b>A</b>		
<b>Autonegotiation</b>	—	Configuration protocol for Ethernet. Before initiating the actual data transmission, network devices automatically negotiate a transmission mode (1000 Mbit/s, 100 Mbit/s or 10 Mbit/s, full duplex or half duplex).
<b>Autosensing</b>	—	Ability of a device to detect the data rate automatically (10 Mbit/s or 100 Mbit/s or 1 000 Mbit/s) and to then send or receive at this rate.
<b>AWG</b>	American Wire Gauge	US standard. Also known as Brown and Sharp (B&S) Wire Gauge. It specifies the diameter of copper conductors.
<b>B</b>		
<b>BERO</b>	Contactless proximity limit switch with feedback oscillator	Proximity switch
<b>BFOC</b>	Bayonet Fiber Optic Connector	Standardized connector for glass fiber-optic cables with a bayonet-lock; also referred to as "ST" (see ST connector)
<b>Broadcast</b>	Circular call in a computer network	Message, with which data packets are transmitted from one point to all stations in a network
<b>bursts</b>	—	Momentarily increased network loading due to a data surge or alarm avalanche
<b>C</b>		
<b>CBA</b>	Component Based Automation	Supports modularization in mechanical and plant engineering through the plant-wide, graphical grouping of distributed applications. Component based Automation based on the PROFINET standard of the PNO.
<b>CC</b>	Central controller	—
<b>CD</b>	Compact disc	—
<b>CSD</b>	<b>C</b> ircuit <b>S</b> witched <b>D</b> ata	Data transmission over a GSM dialup connection
<b>CHAP</b>	Challenge Handshake Authentication Protocol	Authentication protocol
<b>Channel Bonding</b>	—	Two channels are used simultaneously with the help of channel bonding. Gross transmission rates of up to 450 Mbit/s can be achieved in conjunction with the MIMO technology in accordance with IEEE 802.11n.
<b>CLI</b>	Command Line Interface	Alphanumeric command interface for parameterization and diagnosis over a serial interface or TELNET
<b>CLIP</b>	Calling Line Identification Presentation	Transmission of the caller's telephone number (CLIP) is a performance feature for incoming calls and can only be activated or deactivated for these
<b>Client/server communication</b>	Principle of connection setup	The network node that sets up a connection is termed the "client". A "server" on the other hand is the node to which a connection is set up.
<b>CM</b>	Communications Metallic	UL approval for copper cables for use in buildings in accordance with Section 800-53(d) of NEC. Flames do not spread upward from cable out of the cable tray in the Vertical Tray Flame Test in UL 1685, "Vertical-Tray Fire-Propagation and Smoke Release Test for Electrical and Optical-Fiber Cables".
	Communication Module	Module for communications tasks used in an automation system as a CPU interface expansion
<b>CMG</b>	—	UL Approval of a copper cable for laying in cable harnesses (general purpose)
<b>CMIP</b>	Common Management Information Protocol	—
<b>CMIS</b>	Common Management Information Service	—
<b>CMP</b>	Plenum cable (copper)	UL Approval of a copper cable for laying without additional protection in the space above dropped ceilings or below raised floors
<b>CMR</b>	Riser cable (copper)	UL Approval of a copper cable for laying between the floors of a building

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<b>C</b>		
<b>CMX</b>	—	Cable for use in buildings in a cable duct or non-flammable tube. The unprotected lines or cables must not exceed 3 m in length. CMX type cable may bear the title "Outdoor". This cable meets all the conditions of the VW-1 Flame Test Requirements as defined in UL 1581.
<b>CoL</b>	Certificate of License	Certificate accompanying a software product which documents the legal ownership of a software license.
<b>Collision domain</b>	—	In order to ensure the function of the Carrier Sense Multiple Access / Collision Detection (CSMA/CD) procedure, the delay of a data package from one station to the other is limited. Depending on the transmission rate, this delay gives a physically limited expansion of the network, known as the collision domain. For 10 Mbit/s Ethernet this is 4 520 m, and for Fast Ethernet 412 m. Several collision domains can be connected with each other via bridges/switches. Full duplex permits expansions beyond a collision domain.
<b>COM/DCOM</b>	Component Object Model / Distributed Component Object Model	COM is a fundamental object model. It allows an object to make its functionality available to other components. DCOM is an extension of COM for communication over a network.
<b>CP</b>	Communication Processor	Interface module for communication tasks
<b>CPU</b>	Central Processing Unit	e.g. for SIMATIC S5/S7
<b>CSD</b>	Circuit Switched Data	Modem operation
<b>CSMA/CD</b>	Carrier Sense Multiple Access/Collision Detection	Collision access procedure for Industrial Ethernet bus systems as per IEEE 802.3
<b>D</b>		
<b>DA</b>	Destination Address	—
<b>dBi</b>	—	Unit of measurement of antenna gain compared to an isotropic omnidirectional antenna
<b>DCP</b>	Discovery and Configuration Protocol	Defines the allocation of the IP parameters with vendor-specific configuration/programming tools or in the plant-wide engineering, e.g. in the PROFINET interconnection editor
<b>DDE</b>	Dynamic Data Exchange	Windows interface
<b>DDL</b>	Direct Data Link	—
<b>DDLm</b>	Direct Data Link Mapper	—
<b>Deterministic features</b>	—	Predictable data traffic and defined response times
<b>DHCP</b>	Dynamic Host Configuration Protocol	De-facto standard for assigning dynamic IP addresses
<b>Diversity</b>	—	Radio receiver with two antennas for selecting the best signal
<b>DLL</b>	Dynamic Link Library	A collection of functions available to two or more programs, but which are loaded only once into the memory (Windows/Windows NT Feature).
<b>DLPI</b>	Data Link Protocol Interface	—
<b>DNP3</b>	Distributed Network Protocol	Communications standard for telecontrol systems; it is used as general transmission protocol between control station and sub-station
<b>Domain services</b>	—	An application service group which contains services for downloading/uploading of logically related memory areas.
<b>DP</b>	Distributed I/O	Input or output modules that are used by the CPU on a distributed basis. The PLC and the distributed I/O can be connected over the PROFIBUS DP bus system.
<b>DPRAM</b>	Dual Port Random Access Memory	—
<b>DSSS</b>	Direct Sequence Spread Spectrum	Spread spectrum transmission procedure (IEEE 802.11b)

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Term	Meaning	Explanation
<b>D</b>		
<b>DV</b>	Data processing	Previously also referred to as Electronic Data Processing (EDP)
<b>DVD</b>	Digital Versatile Disc	Digital optical storage medium
<b>E</b>		
<b>EEMS</b>	Extended electromechanical interface	—
<b>EGPRS</b>	Enhanced GPRS	Method of increasing the data rate in GSM mobile networks by introducing an additional modulation procedure (2.5G)
<b>EIRP</b>	Equivalent isotropic radiated power	The transmit power that must be fed to an isotropic radiator in order that it effectively emits the same performance as another antenna in a specific direction. An isotropic radiator is a theoretical antenna that radiates evenly in all directions (isotropically) and is assumed to be infinitely small.
<b>EMC</b>	Electromagnetic compatibility	—
<b>ER</b>	Extension rack	Expansion component for SIMATIC
<b>ERP</b>	Enterprise Resource Planning	Term for systems and software solutions which coordinate the business process and help with planning, e.g. SAP R3, Peoplesoft, BAAN.
<b>ERTEC</b>	Enhanced Real-Time Ethernet Controller	The Industrial Ethernet ASIC is a high-performance Ethernet controller, optimized for PROFINET with integral switch functionality and processor
<b>ESD</b>	Electro static discharge	Electric strength
<b>EU</b>	Extension unit	—
<b>Ex</b>	Intrinsically safe protective measure to DIN EN 50020	Appropriately marked modules may also be used within hazardous areas. (Regulations must be observed!)
<b>F</b>		
<b>FB</b>	Function block	—
<b>FC</b>	FastConnect	Fast connection system for Ethernet and PROFIBUS cables and connectors
<b>FC</b>	Function Call	Sequence of functions
<b>FDDI</b>	Fiber Distributed Data Interface	High-speed network standardized by ANSI for data transmission over a range of up to 100 km with a bit rate of 100 Mbit/s. Twin fiber-optic cables in opposite directions serve as the transmission medium.
<b>FDL</b>	Fieldbus Data Link	Layer 2 with PROFIBUS; it comprises the field bus link control (FLC) and medium access control (MAC).
<b>FDX</b>	Full duplex	Capability of a device for sending and receiving data at the same time. In the case of full duplex, collision detection is deactivated. A full duplex capable device is able to buffer data packets.
<b>FE</b>	Fast Ethernet	Compared with 10 Mbps Ethernet, frames at 100 Mbps are transported much faster and therefore occupy the bus for a very short time.
<b>FHSS</b>	Frequency Hopping Spread Spectrum	Transmission procedure used, for example, in Bluetooth.
<b>Filtering</b>	—	A switch filters data traffic depending on the source and destination addresses in a data packet. An incoming data packet is routed by the switch to the port to which the data terminal with the appropriate destination address is connected.
<b>FIFO principle</b>	"First in, first out" principle	Data is transmitted in telecontrol systems regardless of the respective priority
<b>FIM</b>	Field Interface Module	—
<b>Firewall</b>	—	Software or hardware component that allows or prevents data access to a PC or between interconnected networks according to given security restrictions
<b>FM</b>	—	US certificate for the installation of devices in hazardous locations (Factory Mutual Research)

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<b>F</b>		
<b>FMS</b>	Fieldbus Message Specification	Upper sublayer of Layer 7 with PROFIBUS; it encompasses the functions: protocol machine, generation of PDUs, coding/decoding and interpretation of the protocol data unit.
<b>FO</b>	fiber-optic	Fiber-optic cable
<b>FO cable</b>	Fiber-optic cable	Flexible optical medium/fiber made of glass or plastic in which light can be conducted in a controlled manner
<b>Forced Roaming</b>	—	Automatic roaming if the cable connection to the access points is broken
<b>FRNC</b>	Flame Retardant Non Corrosive	Flame-retardant, halogen-free cladding material for a cable
<b>Full duplex</b>	—	Capability of a device for sending and receiving data at the same time. In the case of full duplex, collision detection is deactivated.
<b>Functional grounding</b>	—	Function for internal ground monitoring used for protection against hazardous touch voltages
<b>G</b>		
<b>Gateway</b>	—	Intelligent connection between a local network and an external network with a completely different structure
<b>GHz</b>	Gigahertz	Unit of frequency, e.g. 2.4 GHz
<b>Gigabit Ethernet</b>	—	Gigabit Ethernet (1 Gbit/s) is faster than Fast Ethernet by a factor of 10, occupying the bus for only one tenth of the time.
<b>GMRP</b>	GARP (Generic Attribute Registration Protocol) Multicast Registration Protocol	GMRP enables switches to control the forwarding of multicast messages. A host logs in or out for a multicast address. Accordingly, the managing switch forwards corresponding multicasts to the host or not. This constrains the flooding of multicasts and reduces the network load.
<b>GP</b>	General Purpose	UL listing (safety standard) for network cables is especially necessary for the American and Canadian markets. The requirements for the appropriate approvals depend on where the cable is routed within the building. This applies to all cables which have to be routed from a machine to a remote control cabinet and are positioned on cable racks secured on the building.
<b>GPRS</b>	General Packet Radio Service	A packet of networking mobile communications services based on GSM channels. GPRS enables fast communication at high transmission speeds and is chiefly of interest for mobile Internet access.
<b>GPS</b>	Global Positioning System	Satellite-supported system for determining the position of a GPS receiver. A GPS receiver can be localized precisely anywhere in the world using three of the total of 24 satellites. GPS receivers are typically built into navigation systems.
<b>GSD</b>	General Station Description	A GSD contains an XML-based description of the properties of IO devices such as communications parameters as well as number, type, configuration data, parameter and diagnostics information of modules
<b>GSM</b>	Global System for Mobile Communication	Global standard for mobile communication
<b>GVRP</b>	Generic VLAN Registration Protocol	—
<b>H</b>		
<b>HARDNET</b>	—	Software based on communications modules with internal microprocessor
<b>HART</b>	Highway Addressable Remote Transducer	Protocol for bus-addressed field devices; it is not a fieldbus, but a version of the digital field communication that contains many of the functionalities of fieldbuses
<b>HCS</b>	—	Trademark of Spectran Specialty Optics
<b>H-communication</b>	Fault-tolerant communication	Fault-tolerant, redundant communication with SIMATIC S7-H systems
<b>HDX</b>	Half Duplex	A device can either receive or send data at a given time.
<b>HMI</b>	Human Machine Interface	Operator control and process monitoring products/systems at Siemens

## Abbreviations, Explanations

Term	Meaning	Explanation
<b>H</b>		
<b>HRP</b>	High Speed Redundancy Protocol	For use in high-availability plant networks, high-speed redundancy in the ring can be implemented. The reconfiguration time for 50 switches in the ring is up to 300 ms
<b>HTB</b>	Data handling block	HTB are standard function blocks that allow data transfer between boards outfitted with page frame addresses.
<b>HTML</b>	Hypertext Markup Language	Descriptive language for WWW (World Wide Web) pages
<b>HTTP</b>	Hypertext Transfer Protocol	Transmission protocol for Web pages on the Internet
<b>Hub</b>	—	Active network component with repeater functional scope, synonym for star coupler
<b>I</b>		
<b>ICMP</b>	Internet Control Message Protocol	Additional protocol on the Internet layer, alongside the Internet Protocol (IP); this is used to exchange error and information messages in IP, TCP, and UDP protocols. ICMP packets are always sent as IP datagrams. This serves to inform hosts of more favorable routes to a destination, provide information about routing problems, and break off connections due to problems in the data network. The ping and traceroute commands are based on ICMP. ICMP messages are divided into two classes: error messages and information messages.
<b>IE</b>	Industrial Ethernet	Cell network according to the international IEEE 802.3 (Ethernet) standard, designed for the industrial environment
<b>IEC</b>	International Electrotechnical Commission	Authority that oversees standardization in electrical engineering
<b>IEEE</b>	Institute of Electrical and Electronics Engineers	—
<b>IEEE 802</b>	Institute of Electrical and Electronics Engineers	LAN/WAN Standards Committee
<b>IEEE 802.11</b>	Institute of Electrical and Electronics Engineers	Standard for radio networks (originally in the 2.4 GHz band with transmission rates up to 2 Mbit/s)
<b>IEEE 802.11a</b>	Institute of Electrical and Electronics Engineers	Standard for radio networks in the 5 GHz range with data rates up to 54 Mbit/s.
<b>IEEE 802.11b</b>	Institute of Electrical and Electronics Engineers	Standard for radio networks in the 2.4 GHz range with data rates up to 11 Mbit/s.
<b>IEEE 802.11g</b>	Institute of Electrical and Electronics Engineers	Standard for radio networks in the 2.4 GHz range with data rates up to 54 Mbit/s. Backward compatible with IEEE 802.11b.
<b>IEEE 802.11i</b>	Institute of Electrical and Electronics Engineers	Expanded safety architecture for the 802.11 standard, valid for IEEE 802.11a/b/g; includes TKIP and AES
<b>IEEE 802.11n</b>	Institute of Electrical and Electronics Engineers	The IEEE 802.11n standard uses the MIMO (Multiple In, Multiple Out) technique for data transmission. The expansion of transmission channels from 20 MHz to 40 MHz and the use of three antennas increases the gross data rate to 450 Mbit/s.
<b>IEEE 802.3</b>	Institute of Electrical and Electronics Engineers	Ethernet working group
<b>IEEE 802.3af</b>	Institute of Electrical and Electronics Engineers	Standard that defines the transmission of power and data over one cable (see Power-over-Ethernet)
<b>IEEE 802.3u</b>	Institute of Electrical and Electronics Engineers	Fast Ethernet working group
<b>IGMP</b>	Internet Group Management Protocol	Protocol for load limiting when using multicast-based protocols, e.g. for video monitoring
<b>IM</b>	Interface modules	Interface
<b>INA</b>	Intel Network Architecture	—
<b>Intrinsically safe</b>	—	Ex protection measure according to DIN



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Term	Meaning	Explanation
<b>I</b>		
<b>I/O</b>	Input/Output	—
<b>IO Controller</b>	—	Controller for PROFINET IO in which the automation program executes
<b>IO Device</b>	—	Distributed field device that is assigned to an IO controller
<b>IO supervisor</b>	—	PG/PC with commissioning and diagnostics functions for PROFINET IO
<b>IP</b>	Internetwork Protocol	On its own, the IP protocol is without connections and invalid. The most important information is the unique IP address. The blocks of data are sent to the destination computer independently. IP does not negotiate anything with the destination computer. An end-to-end error check is not performed. Frames can arrive in a different order from the order they were sent in. TCP is responsible for rearranging them in the correct sequence.
<b>IP Alive</b>	—	Monitoring function for IP connections
<b>iPCF</b>	Industrial Point Co-ordination Function	Functional expansion of the IEEE 802.11 standard for applications with a requirement for real-time and deterministics (predictable response times). This facilitates rapid roaming of moving stations from one radio cell to the next and supports secure, wireless PROFINET IO communication with the SIMATIC Mobile Panel 277F IWLAN.
<b>iPCF-MC</b>	iPCF Management Channel	A further development of iPCF; this mode should be used if IWLAN stations that also support iPCF-MC move freely about in the coverage area (especially when using omni-directional antennas) and are to exchange data deterministically.
<b>IPX</b>	—	Protocols of ISO layers 1–4
<b>IP20</b>	—	Device protection class; protection against contact with the fingers and against penetration by solid foreign bodies with diameters in excess of 12 mm; no particular protection against water
<b>IP30</b>	—	Device protection class; protection against contact with tools, wires etc. with diameters in excess of 2.5 mm and against penetration by solid foreign bodies with diameters in excess of 2.5 mm; no particular protection against water
<b>IP65</b>	—	Device protection class; complete protection against contact and against ingress of dust; protection against splash water from all directions
<b>iREF</b>	Industrial Range Extension Function	With this function it is possible to cover a longer distance or a broader range with a single access point, which reduces the number of channels and access points that are used.
<b>IRT</b>	Isochronous real time	Deterministic and isochronous real-time communication for PROFINET for the particularly stringent demands, for example, of motion control applications. Clock rates of less than 1 ms can be achieved by using corresponding hardware.
<b>ISA</b>	Industry Standard Architecture	—
<b>ISDN</b>	Integrated Services Digital Network	Digital network that integrates services
<b>ISM-Band</b>	Industrial, Scientific and Medical-Band	Frequency band for license-free use
<b>ISO</b>	International Organization for Standardization	International Standards Organization
<b>ISP</b>	Internet Service Provider	Internet services provider
<b>IT</b>	Information Technology	Acquisition, conditioning, transmission, distribution, utilization and processing of information
<b>ITC</b>	Instrumentation Tray Cable	Approval for IE FC TP standard cable
<b>ITP (Category 5)</b>	Industrial Twisted Pair	Highly efficient, shielded, twisted pair cable for universal applications (international cabling standard ISO/IEC 11801 and EN 50173)
<b>IWLAN</b>	Industrial Wireless LAN	Industry standard WLAN conforming to IEEE 802.11 standard



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Term	Meaning	Explanation
<b>J</b>		
<b>JVM</b>	Java Virtual Machine	Java is a cross-platform, object-oriented programming language similar to C++. The Java Compiler, however, does not generate native machine code, but a byte code that has to be interpreted. This is done with the aid of the "Java Virtual Machine".
<b>K</b>		
<b>KNX</b>	Konnex (EN 50090, ANSI EIA 776)	Universal bus system for all house and building systems; KNX was developed by the Konnex Association based on EIB (European Installation Bus).
<b>L</b>		
<b>LAN</b>	Local Area Network	Local area network
<b>Layer 3 Routing</b>	—	Function for communication between various IP subnetworks on the basis of Layer 3. Also referred to as IP routing.
<b>LED</b>	Light Emitting Diode	Light emitting diode
<b>Link Aggregation</b>	—	Procedure for bundling several physical interfaces into one logical channel. Used for increasing the data throughput between two Ethernet switches. Implementations can also link servers and other systems by means of link aggregation.
<b>Link Check</b>	—	Cyclic monitoring of a radio link
<b>Link Class</b>	—	In the link class, the quality of a complete connection (link) is described, from the active component to the data terminal (patch cable, patch field, installation cable, connection socket, connecting cable). This link must comply with the values specified in the standard for structured cabling ISO/IEC 1180. Contrary to this is the specification according to "categories" where only product requirements are defined, e.g. category 5 cable.
<b>LLC</b>	Logical Link Control	Standardized network protocol
<b>LLDP</b>	Link Layer Discovery Protocol	This is a multi-vendor protocol for topology support on the link layer which enables a device connected to an Ethernet to advertise its identity and properties to other devices. This information is stored in the management information base (MIB) and collected using the simple network management protocol (SNMP).
<b>LLI</b>	Lower Layer Interface	Part of layer 7 with PROFIBUS, in which layer 7 services are mapped onto layer 2 services
<b>Load decoupling</b>	—	Due to filtering, a switch ensures that local data traffic remains local. Local network loading of a segment is decoupled from the remainder of the network.
<b>M</b>		
<b>MAC</b>	Media Access Control	Bus access control
<b>MAN</b>	Metropolitan Area Network	Data network with the geographical range of a town
<b>MAP</b>	Manufacturing Automation Protocol	International standard for automation protocols
<b>Media redundancy</b>	—	Redundancy in the network infrastructure (cable and active components such as OLM or OSM/ORM)
<b>MIB</b>	Management Information Base	A file for generating device profiles; it enables other SNMP-enabled devices, for example, to be integrated into the OPC configuration through loading of MIBs in accordance with the SMI V1 and SMI V2 standard from STEP 7 V5.4
<b>MIMO</b>	Multiple Input, Multiple Output	Multiple path propagation in accordance with the international standard IEEE 802.11n. This allows the devices to use several antennas in parallel in order to achieve a higher transmission rate and reduce susceptibility to faults in environments with a high number of reflections.
<b>MMS</b>	Manufacturing Message Specification	User interface of MAP
<b>Monoprotocol</b>	—	Data can only be transferred through one protocol
<b>MPI</b>	Multi Point Interface	Multipoint-capable interface for SIMATIC S7
<b>MRP</b>	Media Redundancy Protocol	The Medium Redundancy Protocol (MRP) is based on a ring topology and guarantees reconfiguration times of 200 ms

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<b>M</b>		
<b>MRPD</b>	Media Redundancy for Planned Duplication	Standard for radio networks (originally in the 2.4 GHz band with transmission rates up to 2 Mbit/s)
<b>Multicast</b>	—	Multicast or Group calling in telecommunications signifies Message transmission from one point to a group (also termed Multipoint connection). The advantage of multicasting is that messages can be sent simultaneously to several stations or to a closed user group, without multiplying the bandwidth at the transmitting end by the number of recipients.
<b>Multiple path propagation</b>	—	Reflections of a radio wave off different objects in a room. This causes the radio wave to arrive at the receiver with variations of intensity and delay
<b>Multiplex function</b>	—	Multiplex function (with OP communication) increases the number of OPs that can be connected to a SIMATIC S7-300
<b>Multi-protocol</b>	—	Data can be transferred through one or two protocols
<b>N</b>		
<b>NAT</b>	Network Address Translation	Translation of private IP addresses into public addresses
<b>NC</b>	Numerical Control	Numerical control (machine tools)
<b>NCM</b>	Network and Communication Management	Tool for configuring communication connections, also a component of STEP 7
<b>NDIS</b>	Network Driver Interface Specification	Microsoft and 3Com interface
<b>NEC</b>	National Electrical Code	UL directive for the laying of cables in buildings
<b>NIC</b>	Network Interface Card	Line connection
<b>N-measurement</b>	—	Device installation measurement for subdivisions of the electrical installation
<b>NTP</b>	Network Time Protocol	Standardized protocol for synchronization of clocks in Computer systems over Communication networks
<b>O</b>		
<b>OFDM</b>	Orthogonal Frequency Division Multiplex	Modulation procedure for IEEE 802.11a/g
<b>OFN</b>	Optical Fiber Non-conductive	UL approval for fiber optic cables for use in buildings in accordance with Section 800-53(d) of NEC. Flames do not spread upward from cable out of the cable tray in the Vertical Tray Flame Test in UL 1685, "Vertical-Tray Fire-Propagation and Smoke Release Test for Electrical and Optical-Fiber Cables".
<b>OFNG</b>		UL Approval of a fiber optic cable for laying in cable harnesses (general purpose)
<b>OFNP</b>	Plenum cable (FOC)	UL Approval of a fiber optic cable for laying without additional protection in the space above dropped ceilings or below raised floors
<b>OFNR</b>	Riser cable (FOC)	UL Approval of a fiber optic cable for laying between the floors of a building
<b>OLE</b>	Object Linking and Embedding	Central architecture principle in Windows for the generation and editing of documents that contain objects generated by different applications
<b>OLM</b>	Optical link module	Network component for PROFIBUS
<b>Omnidirectional</b>	—	Antenna that radiates evenly through 360 degrees in both horizontal and vertical planes
<b>OP</b>	Operator Panel	—
<b>OPC</b>	Openness, Productivity, Collaboration	Standard interface for access to process data
<b>OPC DA</b>	OPC Data Access	Standard for Ethernet-based access to data of measurement and control devices, for the location of OPC servers and the simple browsing in the name spaces of the OPC servers on the basis on client/server communication
<b>OPC UA</b>	OPC Unified Architecture	OPC UA is the further development of the standard interface OPC and provides additional functions such as security and redundancy.
<b>OSPF</b>	Open Shortest Path First	Dynamic routing

## Abbreviations, Explanations

Term	Meaning	Explanation
<b>P</b>		
<b>PA</b>	Process Automation	Protocol profile, based on PROFIBUS DP with intrinsically safe transmission system to IEC 61158-2
<b>PAN</b>	Personal Area Network	Comparable with an ad-hoc network, for networking individual small devices a short distance from each other.
<b>PAP</b>	Password Authentication Protocol	Password authentication protocol
<b>PAT</b>	Port Address Translation	Translation of private ports into public addresses
<b>PCF</b>	Polymer clad fiber	Plastic-enclosed glass fiber
<b>PCI</b>	Peripheral Component Interconnect Express	Backplane bus in personal computers
<b>PCIe</b>	Peripheral Component Interconnect Express	Backplane bus in PC with, for example, a higher data transmission rate than the predecessor PCI
<b>PCMCIA</b>	Personal Computer, Memory Card, International Association	Standard for PC plug-in cards (credit card size). PCMCIA cards (Personal Computer Memory Card International Association) are used mainly input/output operations (e.g. modem) or memory expansions.
<b>PCS 7</b>	—	Siemens process control system
<b>PDU</b>	Protocol Data Unit	Protocol data unit
<b>PG</b>	Programming device	—
<b>PI</b>	Program instance	Communication object
<b>PLC</b>	Programmable logic controller	Device for open and closed loop control tasks
<b>PN</b>	PROFINET	Industrial Ethernet standard defined by the PNO
<b>PNO</b>	PROFIBUS Nutzerorganisation e.V.	Organization for PROFIBUS users and providers
<b>PoE</b>	Power over Ethernet	Transmission of power and data on a single cable
<b>POF</b>	Polymer optic fiber	Fiber optic cable made of light-conducting plastic
<b>Polling</b>	—	Addressed transmission call in centrally-oriented data networks polling mode. The poll is the command to a specific station to send messages. In this way the poll sequences control the data flow.
<b>POP</b>	Point of Presence	Dial-in node for an Internet service provider
<b>PP</b>	Push Button Panels	—
<b>PPM</b>	Parts per million	—
<b>PPTP</b>	Point-to-Point Tunneling Protocol	—
<b>Process or field communication</b>	—	Process or field communication is used for linking actuators/sensors to a CPU.
<b>PROFIBUS</b>	Process Field Bus	International fieldbus standard according to IEC 61158/61784
<b>PROFIBUS DP</b>	PROFIBUS DP for distributed I/O	Protocol profile according to IEC 61158/61784 for process or field communication for fast, cyclic data exchange with field devices
<b>PROFIBUS PA</b>	PROFIBUS for process automation	Protocol profile, based on PROFIBUS DP with intrinsically safe transmission system to IEC 61158-2.
<b>PROFIdrive</b>	—	PROFIBUS protocol profile, based on PROFIBUS DP, driven engineering profile (version 3, clock synchronization)
<b>PROFIenergy</b>	—	Protocol profile that provides functions and mechanisms for PROFINET field devices that support energy-efficient production
<b>Profile</b>	—	Definition of options and parameters as a supplement to the standard, e.g. PROFIBUS profiles
<b>PROFINET</b>	—	Industrial Ethernet standard defined by the PNO
<b>PROFINET device with proxy functionality</b>	—	A PROFINET device that takes on the role of the master with regard to PROFIBUS devices. This makes it possible to link PROFIBUS slaves into the PROFINET communication. If the device has a local (internal) PROFIBUS, it has the role of DP master with regard to the local DP slaves.

## Appendix

### Abbreviations, Explanations

Term	Meaning	Explanation
<b>P</b>		
<b>PROFIsafe</b>	—	Protocol profile in accordance with IEC 61508 that permits standard and safety-related communication on a bus. Communication between fail-safe controllers and fail-safe I/O is handled by PROFIsafe.
<b>Protocol</b>	—	Procedural regulation for data transmission. This regulation specifies both the message formats and the data flow during data transmission
<b>Proxy</b>	—	Representative object in the object model that maps the PROFINET view onto a field device or a group of field devices. The proxy on the PROFINET is the representative for one or more PROFIBUS devices
<b>PST</b>	Primary Setup Tool	Software tool for assigning IP addresses
<b>PUR</b>	Polyurethane	—
<b>R</b>		
<b>RADIUS</b>	Remote Authentication Dial-In User Service	Access control by means of servers
<b>RAM</b>	Random Access Memory	Random access memory
<b>Rapid Spanning Tree Protocol</b>	Configuration protocol specified in the IEEE-802.1w standard	The rapid spanning tree protocol is a further development of the spanning tree protocol (STP). It is used to avoid redundant network paths (loops) in the LAN, specifically when using switches; the reconfiguration time ranges from 2-3 seconds.
<b>RBC</b>	Remote Base Controller	—
<b>RegTP</b>	—	Regulation authority for telecommunications in Germany
<b>Remote diagnostics and remote maintenance (teleservice)</b>	—	Teleservice is data exchange with physically remote technical plants (machines, plants, computers, etc.) for the purpose of error detection, diagnostics, maintenance, repair, or optimization.
<b>Requirement specification</b>	Automation Protocol	Layers 5 through 7 of the ISO reference model
<b>RIPv1/2</b>	Routing Information Protocol	—
<b>RJ45</b>	Symmetrical connector for data cables	This is also known as a western connector or a western plug. This is a widely used plug connector in telephone and ISDN technology which is used in LAN installations in the office environment.
<b>RM</b>	Redundancy manager	Function for monitoring the network; the RM detects the failure of a transmission link in the ring or of a switch and activates the standby link
<b>RMON</b>	Remote Monitoring	Network administration function, e.g. collection of statistics information
<b>Roaming</b>	—	Free movement of wireless LAN stations across the cell boundaries of an access point. The station can switch from one radio cell to the next without any noticeable interruption
<b>R-SMA</b>	—	Reverse-SMA, connector for antennas in IWLAN
<b>RSTP</b>	Rapid Spanning Tree Protocol	The rapid spanning tree protocol is a further development of the spanning tree protocol (STP). The spanning tree protocol (STP) is used for avoiding redundant network paths (loops) in the LAN, specifically in switched environments; the reconfiguration time is in the range of 2–3 seconds.
<b>RT</b>	Real-time	Real-time communication in PROFINET
<b>S</b>		
<b>SA</b>	Source Address	Part of the IP header; contains the source address of the IP packet; 32 bits wide
<b>SAP</b>	Service Access Point	Service access point: an interface allowing the user to access services of the lower layer
<b>SC connection technology</b>	—	Standardized connection for glass fiber optic cables
<b>SC RJ connection technology</b>	—	Standardized connection for fiber optic conductors, e.g. for POF and PCF fiber optic cable

## Abbreviations, Explanations

Term	Meaning	Explanation
<b>S</b>		
<b>SCALANCE</b>	Scalable Performance	Name of the SIMATIC NET product generation for active Industrial Ethernet network infrastructure components
<b>SDA service</b>	Send Data with Acknowledge (open Layer 2 access)	Sending of acknowledged Layer 2 services
<b>SDN</b>	Send Data with No Acknowledge (open Layer 2 access)	Sending of unacknowledged Layer 2 services (broadcast, multicast)
<b>SFB</b>	System Function Block	A System Function Block (SFB) is a function block that is integrated in the S7 CPU. Because SFBs are part of the operating system, they are not loaded as part of the program. SFBs are blocks with a "memory". Instance data blocks must also be generated for SFBs and loaded as part of the program into the CPU
<b>SFC</b>	System function calls	Calls that are integrated into the operating system of the CPU, e.g. time functions or block transfer
<b>SFM</b>	System error signaling concept of SIMATIC	—
<b>SFP</b>	Small Form-factor Pluggable (coll. mini-GBIC)	Small standardized modules for network connections. SFPs are modular optical or electrical transceivers that are constructed as cable connectors in an SFP slot for extremely fast Ethernet. Network devices can therefore be easily changed to other media and the transceivers can be quickly replaced in the event of an error.
<b>Shared LAN</b>	—	All components in a shared LAN share the nominal data transmission rate. Shared LANs are constructed with repeaters/hubs.
<b>Signal delay</b>	—	Time that a data packet takes to travel through the network
<b>SINEMA Server</b>	SIMATIC Network Manager Engineering	Web-based network monitoring software
<b>Slot Time</b>	—	Time elapsing between transmission of a call and reception of an answer or acknowledgment
<b>SM</b>	Signal module	Input and output modules for SIMATIC
<b>SMTP</b>	Simple Mail Transfer Protocol	Transmission protocol for e-mail
<b>SNMP</b>	Simple Network Management Protocol	Standardized protocol for the transport of network management information
<b>SNTP</b>	Simple Network Time Protocol	Standardized protocol for synchronization of clocks in Computer systems over Communication networks
<b>Socket interface</b>	Standard communication for Industrial Ethernet	This facilitates data communication with computers through TCP/IP. On this interface, which is widespread in the PC and UNIX world, users can freely program their own protocols. The SEND/RECEIVE blocks are used as access to TCP/IP in SIMATIC S7.
<b>SOFTNET</b>	—	Software based on simple communications modules
<b>SP</b>	Service packs	Data that can easily be downloaded free of charge from the Internet.
<b>Spanning Tree Protocol</b>	Bridge configuration protocol specified in the IEEE-802.1d standard	The Spanning Tree Protocol is used to eliminate loops in any meshed networks. The reconfiguration time is in the region of 30 s.
<b>SPC</b>	Siemens PROFIBUS Controller	—
<b>SSID</b>	Service Set Identifier	Identification of a wireless network based on the IEEE 802.11 standard
<b>S/STP</b>	Screened Shielded Twisted Pair	In this cable construction the individual twisted pairs are wrapped in a foil shield. The two individually shielded pairs of conductors are then wrapped together in a braided copper shield.
<b>Standby function</b>	—	Function for redundant coupling network segments, such as for the coupling of redundant ring structures
<b>ST connector</b>	Straight-tip connector	Standardized connector for glass fiber-optic cables with bayonet lock (ST is a registered trademark of AT&T); see BFOC

## Appendix

### Abbreviations, Explanations

Term	Meaning	Explanation
<b>S</b>		
<b>STP</b>	Spanning Tree Protocol (IEEE 802.1d Standard)	The Spanning Tree Protocol is used to eliminate loops in any meshed networks. The reconfiguration time is in the region of 30 s.
<b>Switching</b>	—	Establishing several links between the ports simultaneously. These links are established dynamically and temporarily in accordance with the data traffic.
<b>SWR</b>	Standing Wave Ratio	Ratio between the energy radiated by an antenna and the energy that the antenna reflects to the radio module
<b>S<sub>0</sub> interface</b>	—	Basic interface for ISDN for connecting data terminals
<b>S7 routing</b>	—	PG/OP communication via different networks
<b>T</b>		
<b>TCP/IP</b>	Transport Control Protocol/Internet Protocol	De-facto standard; Protocol for worldwide communication with the Ethernet.
<b>Telecontrol</b>	—	The connection of distant process stations to one or more central control systems. Various different public or private networks can be used for communication for the purposes of monitoring and control. Event-driven or cyclic exchange of process data is performed with special telecontrol protocols and enables the operating personnel to manage the overall process effectively.
<b>Teleservice (remote diagnostics and remote maintenance)</b>	—	Teleservice is data exchange with physically remote technical plants (machines, plants, computers, etc.) for the purpose of error detection, diagnostics, maintenance, repair, or optimization.
<b>TD</b>	Text Display	—
<b>TF</b>	Technological functions	Application layer 7 for Industrial Ethernet (includes user services)
<b>TFTP</b>	Trivial File Transfer Protocol	Standard for data transmission
<b>Thin Client</b>	—	The principle of thin client/server computing is based on the fundamental physical separation of data.
<b>TIA</b>	Totally Integrated Automation	Fully integrated and company-wide system for automation from Siemens for company-wide configuration/programming, data management and communication.
<b>TKIP</b>	Temporal Key Integrity Protocol	Procedure for changing the keys in the WLAN
<b>Token</b>	—	The bit pattern with control function in token ring and token bus LANs; it is often the same as a send authorization
<b>Token Passing</b>	—	A collision-free access method, the send authorization (token) circulates between nodes which form a logical ring
<b>Topology</b>	Configuration of cables between the various nodes	The major forms of topology are: <ul style="list-style-type: none"> <li>• Linear</li> <li>• Tree</li> <li>• Ring</li> <li>• Star</li> </ul> Combinations of all basic types are possible.
<b>TP</b>	Touch panel	—
<b>TPC</b>	Transmission power control	Automatic regulation of the transmit power in the 5 GHz band
<b>Trap</b>	—	When specific events occur, such as link up or link down, alarms with corresponding error messages can be transmitted by network components on the Ethernet. In SNMP these alarms are called "traps".
<b>Triaxial cable</b>	—	The SIMATIC NET 727-0 bus cable is based on the coaxial cable specified in the 10Base5 standard (IEEE 802.3) – but strengthened with a thick aluminum outer sheath for industrial use.
<b>Twisted-pair</b>	Data cable with twisted pairs of conductors	The twist in the wire pairs provides good transmission properties and prevents electromagnetic interference. Twisted-pair cables are available in different qualities for different transfer rates

## Abbreviations, Explanations

Term	Meaning	Explanation
<b>U</b>		
<b>UDP</b>	User Datagram Protocol	Connectionless data transmission, i.e. datagram service that does not guarantee secure transmission. Users must take their own measures to ensure secure transmission. Data is transmitted as a data block. Transmission of data without RFC 1006 is thus possible.
<b>UL</b>	Underwriters Laboratories	Certification for the US market
<b>UMTS</b>	Universal Mobile Telecommunications System	Standard for third-generation (3G) mobile voice, audio, image, video, and data communication with a transmission rate of several Mbit/s
<b>USB</b>	Universal Serial Bus	Standard for the connection of I/O devices. USB (Universal Serial Bus) supports relatively high data transmission rates and can be used to connect several devices to a single computer.
<b>V</b>		
<b>Variable Services</b>	—	Application service group; it provides services for processing variables
<b>VLAN</b>	Local Area Network	Virtual LAN within a physical network. A widely used technical implementation of VLANs is partly defined in the IEEE 802.1Q standard.
<b>VNS</b>	Virtual Network Services	Centralized security mechanism for each user group that protects the data securely against unauthorized access and manipulation.
<b>VPN</b>	Virtual Private Network	Technology/network type for the secure transport of confidential data over potentially insecure IP networks, e.g. Internet
<b>VRRP</b>	Virtual Router Redundancy Protocol	Procedure for improving the availability of important gateways in local networks by means of redundant routers.
<b>W</b>		
<b>WAN</b>	Wide Area Network	Network that, in contrast to a LAN or MAN, can spread across countries or continents
<b>WDS</b>	Wireless Distribution System	Communication between two WLAN access points
<b>WECA</b>	Wireless Ethernet Compatibility Alliance	Alliance of wireless LAN product vendors who guarantee the compatibility of their products by means of testing.
<b>WEP</b>	Wired Equivalent Privacy	Encryption method for WLANs
<b>Wi-Fi seal</b>	Wireless Fidelity	Seal of the WECA identifying compatible and tested products .
<b>WinCC</b>	—	Open process visualization system for the operator control and process monitoring of SIMATIC HMI.
<b>WirelessHART</b>	—	Wireless HART communication to fieldbuses in the process industry. The HART Communication Foundation (HCF) specified WirelessHART and published it as a component of the HART Standard V7.1. The radio transmission is based on the wireless communications standard IEEE 802.15.4.
<b>Wireless LAN</b>	—	Wireless network
<b>Workflow</b>	—	Workflow systems are used when structuring and controlling workflows.
<b>WPA</b>	Wi-Fi Protected Access	Encryption mechanism in radio networks for protection against eavesdropping and unauthorized access
<b>WS</b>	Workstation	—
<b>WWW</b>	World Wide Web	Multimedia service on the Internet. Distributed hypertext information system on client/server architecture through HTTP protocol
<b>X</b>		
<b>XML</b>	Extensible Markup Language	Definition of a structured data description
<b>XMP</b>	X/Open Management Protocol	—
<b>XTI</b>	UNIX Transport Layer Interface	Layer 4 transport layer, standardized under UNIX
<b>X.25</b>	—	Interface between terminal and data transmission equipment for terminals which operate in packet mode in public data networks and are transported through dedicated lines



## Appendix

### Siemens Industry Training

#### Faster and more applicable know-how: Hands-on training from the manufacturer

Siemens Industry Training provides you with comprehensive support in solving your tasks.

Training by the market leader in the industry enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.



First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

#### Achieve more with Siemens Industry Training

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

#### Contact

Visit our site on the Internet at:

[www.siemens.com/sitrain](http://www.siemens.com/sitrain)

or let us advise you personally.

#### Siemens Industry Training Customer Support Germany:

Phone: +49 911 895-7575

Fax: +49 911 895-7576

E-Mail: [info@sitrain.com](mailto:info@sitrain.com)

#### Highlights Siemens Industry Training

##### Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

##### Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

##### Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

##### Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

##### The right mixture: Blended learning

"Blended learning" is a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.



**Training program for SIMATIC NET**

The SIMATIC NET trainings provide your employees the necessary overview and detailed skills for industrial communication. In addition to planning and configuration with SIMATIC NET, the use, programming, commissioning and servicing of the products are included in the training.

More information on course contents, dates and prices is available on the Internet at:

[www.siemens.com/sitrain](http://www.siemens.com/sitrain)

Commissioning engineers, configuration engineers				
Project managers, project team members		Programmers	Service personnel	
Decision makers, sales personnel			Operators, users	
			Maintenance personnel	
Title	Target group		Duration	Short title

**SIMATIC NET Industrial Communication**

<b>Industrial Ethernet</b>									
Industrial Ethernet System Course			✓	✓	✓	✓	✓	3 days	IK-IESYS
Security in Industrial Ethernet Networks	✓	✓						2 days	IK-IESECWS
Industrial Ethernet by Siemens			✓	✓	✓		✓	WBT	WT-IESI
<b>PROFINET</b>									
PROFINET System Course			✓	✓	✓	✓	✓	3 days	IK-PNSYS
Certified PROFINET Network Installer			✓	✓	✓		✓	2 days	IK-PNOCPI
Certified PROFINET Network Engineer			✓	✓	✓		✓	2 days	IK-PNOCPE
PROFINET			✓	✓	✓		✓	WBT	WT-PROFIN
<b>Industrial Wireless Communication</b>									
Industrial Wireless LAN System Course			✓	✓	✓		✓	2 days	IK-IWLANSYS
<b>PROFIBUS</b>									
PROFIBUS System Course			✓	✓	✓		✓	3 days	IK-PBSYS
PROFIBUS			✓	✓	✓	✓	✓	WBT	WT-PROFI
<b>AS-Interface</b>									
Actuator Sensor-Interface System Course	✓	✓	✓	✓	✓		✓	3 days	IK-ASISYS
<b>SINAUT ST7</b>									
Engineering SINAUT ST7			✓	✓	✓		✓	5 days	IK-SINAUT

## Appendix

### Standards and approbations

#### CE marking

##### Overview

In as far as the electronic products described in this Catalog are subject to requirements and protection goals stipulated in EG guidelines, the relevant EG conformity declarations for the competent authorities are held available at:

##### **SIMATIC:**

Siemens AG  
Industry Sector  
IA AS EWA  
Postfach 1963  
D-92209 Amberg  
GERMANY

##### **SIMATIC NET:**

SIEMENS AG  
Industry Sector  
IA SC CI  
Postfach 4848  
D-90327 Nürnberg  
GERMANY

##### **SIMATIC HMI:**

SIEMENS AG  
Industry Sector  
IA AS SM ID  
Postfach 4848  
D-90327 Nürnberg  
GERMANY

SIMATIC NET products are designed for operation in industrial environments:

Noise emissions:  
EN 61000-6-4: 2007 + A1:2011  
Noise immunity:  
EN 61000-6-2: 2005

Selected modules comply with stringent requirements with regard to emitted interference and are therefore allowed to be used in an industrial as well as in a domestic environment:

Noise emissions:  
EN 61000-6-3: 2007 + A1:2011  
Noise immunity:  
EN 61000-6-2: 2005

Please take details regarding the fulfillment of specific European standards (EN) from the technical documents (manuals) associated with the product. Prerequisite for the fulfillment of the aforementioned protection goals is strict observance of the installation guidelines described in the manuals during the installation and operation of the products.

The installation guidelines described in the manuals and the important notes concerning installation in cabinets and the use of shielded cables must be complied with when installing and operating the products described in this catalog.

##### Notes for machine manufacturers

The SIMATIC automation system is not a machine in the sense of the EC Machinery Directive. For SIMATIC therefore no Declaration of Conformity in terms of the EC Machinery – Directive 89/392/EEC or 2006/42/EC (new edition, applicable from end of 2009) may be issued.

The EC Machinery Directive regulates the requirements for a machine or sub-unit of a machine. Machine in this context is defined as an entity of connected parts or devices (see also EN 292-1, Para. 3.1).

SIMATIC is part of the electrical equipment of a machine and must therefore be included in the assessment of the machine as a whole.

As an electrical resource, SIMATIC is subject to the low-voltage directive that, like the machine directive, also covers all hazards as a "total safety directive".

The EN 60204-1 standard (Safety of machines, general requirements – for the electrical equipment of machines) applies for the electrical equipment of machines.

The following table should help you when drawing up your declaration of conformity and shows which criteria apply to SIMATIC in accordance with EN 60204-1:2006/A1:2009.

You can obtain – further information from the enclosed declaration of conformity in accordance with the low-voltage and EMC directive (with the list of standards complied with).

EN 60204-1	Topic/criterion	Notes
Paragraph 4	General requirements	The requirements are met when the equipment is assembled/ installed in accordance with the installation guidelines. Please note the relevant information in the manuals
Paragraph 11.2	Digital input/output interfaces	The requirements are met
Paragraph 12.3	Programmable equipment	The requirements are met when the equipment is installed in lockable cabinets to protect against alteration of the memory contents by unauthorized persons.
Paragraph 20.4	Voltage tests	The requirements are met

#### Certificates, authorizations, approbations, declarations of conformity

An overview of the certificates available for SIMATIC NET products (CE, UL, CSA, FM, shipping authorizations) and classification figures (MTBF) can be found in the Internet at:

[www.siemens.com/simatic-net](http://www.siemens.com/simatic-net)



Other certificates for SIMATIC products can be found in the Internet at:

SIMATIC

[www.siemens.com/simatic/certificates](http://www.siemens.com/simatic/certificates)

Industrial Controls

<http://www.siemens.com/industrial-controls/support>

The lists are continuously updated. The data for products which has not yet been included in the overview is continuously collected and prepared for the subsequent edition.

You can find certificates, approbations, verification certificates or characteristic curves under:  
Support\Infomaterial\Certificates

#### Quality management

The quality management system of the Industry Sector, Industry Automation division, complies with the international standard EN ISO 9001.

The products and systems described in this catalog are sold under application of a quality management system certified by DQS and TÜV (German Technical Inspectorate) in accordance with ISO 9001.

The certificates are recognized in all EQ Net countries.

#### DQS Registered Certificate Nos.:

Siemens AG  
Industry Sector  
Industry Automation

- Industrial Automation Systems  
Reg.-No.: 001323 QM08
- Sensors and Communication  
Reg.-No.: 000656 QM08
- Control Components and Systems Engineering  
Reg.-No.: 001108 QM08

#### Drive Technologies

Motion Control Systems  
Reg.-No.: 001258 QM08

## Appendix

### Partner at Industry

#### Overview



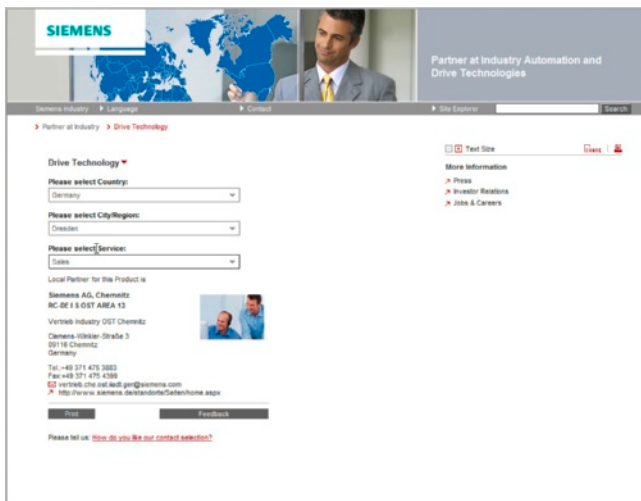
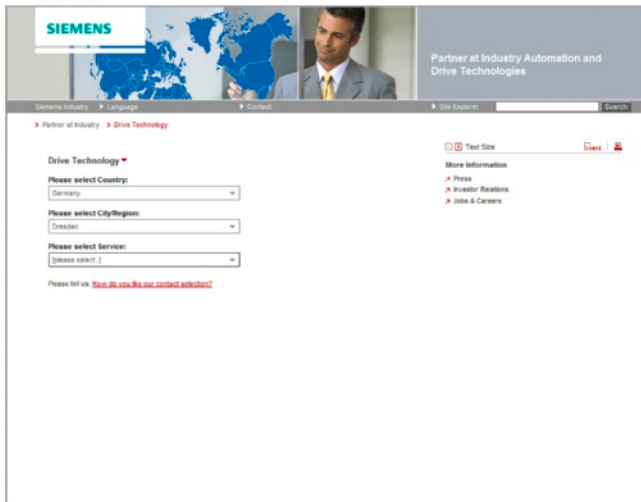
At Siemens Industry we are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at: [www.siemens.com/automation/partner](http://www.siemens.com/automation/partner)

You start by selecting a

- Product group,
- Country,
- City,
- Service.



## Overview

## Siemens Solution Partner Automation Drives

Solution Partner: Highest quality - guaranteed

The products and systems from Siemens Industry Automation and Drive Technologies offer the ideal platform for all automation applications.

Under the name of Siemens Solution Partner Automation Drives, selected system integrators around the world act as uniformly qualified solution providers for the Siemens range of products and services in the fields of automation and drives. Day after day, they utilize their qualified product and system know-how as well as their excellent industry expertise to your advantage – for all requirements.

The partner emblem is the guarantee and indicator of proven quality. The basis for this are defined quality features that identify Solution Partners as reliable and competent solution providers:

- **Solution quality**  
Always a good result with tried and tested solutions expertise.
- **Expert quality**  
Certified technical competence ensures maximum efficiency.
- **Project quality**  
With proven project experience straight to the target.
- **Portfolio quality**  
Comprehensive portfolio for state-of-the-art solutions from a single source.

## Solution Partner Finder

 The screenshot shows the 'Partner Finder' web interface. At the top, there's a header with the Siemens logo and a navigation bar with 'Partner Finder', 'Language', and 'Contact'. Below the header, the main content area is titled 'Partner Finder' and contains introductory text. It then presents two search options: 'Approved Partner' and 'Solution Partner'. The 'Solution Partner' section is active, showing a search form with fields for Technology, Industry, Service, Country, Region/State, and Company/CIF code. There are also tabs for 'Partner search', 'Reference search', and 'Industry events'. A 'Find' button is at the bottom right. A note on the right side states: 'Please note that the search criteria entered are linked with and.'

The Siemens Solution Partner Program helps you to find the optimum partner for your specific requirements.

Support is provided by the Solution Partner Finder, a comprehensive online platform that showcases the profiles of all our solution partners. You can convince yourself of the competence of the respective Solution Partner by means of the references provided. Various search criteria are available for this purpose.

Once you have located a partner, you are only one small step away from contacting them.

Find the right partner here for your specific task and convince yourself of the solution competence provided:

[www.siemens.com/automation/partnerfinder](http://www.siemens.com/automation/partnerfinder)

Additional information on the Siemens Solution Partner Program is available online at:

[www.siemens.com/solutionpartner](http://www.siemens.com/solutionpartner)



## Appendix

### Siemens Automation Cooperates with Education

#### Applicable practical know-how

#### Comprehensive teaching support for educational institutions

Cooperates  
with Education

Automation

SIEMENS

#### Siemens Automation Cooperates with Education (SCE)

offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the knowledge transfer for Industry 4.0.

#### Our services at a glance

- Training curriculums for your lessons
- Trainer packages for hands-on learning
- Courses convey up-to-date, specialist knowledge
- Support for your projects/textbooks
- Complete didactic solutions from our partners
- Personal contact for individual support

#### Training curriculums for your lessons



Use our profound industrial know-how for practice-oriented and individual design of your course. We offer you more than 100 didactically prepared training curriculums on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

Particular highlights:

- With the new SIMATIC PCS 7 curriculums and trainer packages, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester), using plant simulation.

- The new TIA Portal training materials for SIMATIC S7-1200 are available in English, German, French, Italian, Spanish and Chinese for download.

[www.siemens.com/sce/documents](http://www.siemens.com/sce/documents)

#### Trainer packages for hands-on learning



Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price reduced bundles available exclusively to schools include innovative and flexible hardware and software packages. SCE can currently offer more than 90 SCE trainer packages including related equipment. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:

- Introduction to automation technology with LOGO! logic module and SIMATIC S7-1200 compact controller
- PLC engineering with SIMATIC S7 hardware and STEP 7 software (S7-300, S7-1500 and TIA Portal)
- Operator control and monitoring with SIMATIC HMI
- Industrial networking over bus systems with SIMATIC NET (PROFINET, PROFIBUS, IO-Link)
- Sensor systems with VISION, RFID and SIWAREX
- Process automation with SIMATIC PCS 7
- Power Monitoring Devices SENTRON PAC 4200
- Motor Management SIMOCODE
- Networked drive and motion technologies with SINAMICS/SIMOTION
- CNC programming with SinuTrain

#### Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

[www.siemens.com/sce/tp](http://www.siemens.com/sce/tp)



**Comprehensive teaching support for educational institutions** (continued)**Courses convey up-to-date specialist knowledge**

Profit from our excellent know-how as the leader in industrial technologies. We offer you specific courses for automation and drive technology worldwide. These support you in the practice-oriented transferring of product and system know-how, are in conformance with curriculums, and derived from the training fields. Compact technical courses especially for use at universities are also available.

Our range of courses comprises a wide variety of training modules based on the principle of Totally Integrated Automation (TIA). The focus is on the same subject areas as with the SCE trainer packages.

Every PLC and drive course is oriented on state-of-the-art technology. Your graduates can thus be prepared optimally for their future professional life.

In some countries we are offering classes based on our training curriculums. Please inquire with your SCE contact partner.

[www.siemens.com/sce/contact](http://www.siemens.com/sce/contact)

**Support for your projects/textbooks**

Automation and drive technology is characterized by continuous and rapid developments. Service and Support therefore play an important role.

We can provide you with consulting for selected projects and support from your personal SCE contact as well as our web based and regional Customer Support.

As a particular service, SCE supports technical authors with our know-how as well as with intensive technical consulting. Siemens library of special textbooks covering the industrial automation sector provides an additional resource for you and your students. These can be found at the SCE web site.

[www.siemens.com/sce/contact](http://www.siemens.com/sce/contact)  
[www.siemens.com/sce/books](http://www.siemens.com/sce/books)

**Complete didactic solutions**

Our partners for learning systems offer a wide range of training systems and solutions for use in your courses or laboratory.

These models have been designed based on our trainer packages and thus save you the time and cost of self-construction of individual components. The Partner systems provide you with simple and effective help in the fulfillment of your teaching assignment.

[www.siemens.com/sce/partner](http://www.siemens.com/sce/partner)

**Contact for individual support**

You can find your personal SCE contact on our Internet site. Your local SCE Promoter will answer all your questions concerning the complete SCE offering, and provide you with timely and competent information about innovations. When you encounter challenges, you can profit from our global team of excellence.

If a direct SCE contact is not listed for your country, please contact your local Siemens office.

[www.siemens.com/sce/contact](http://www.siemens.com/sce/contact)

**SCE Support Finder for your Internet request**

You are an educator and need support on the topic of industry automation? Send us your request:

[www.siemens.com/sce/supportfinder](http://www.siemens.com/sce/supportfinder)

Scan the QR  
code for further  
information  
(SCE homepage)

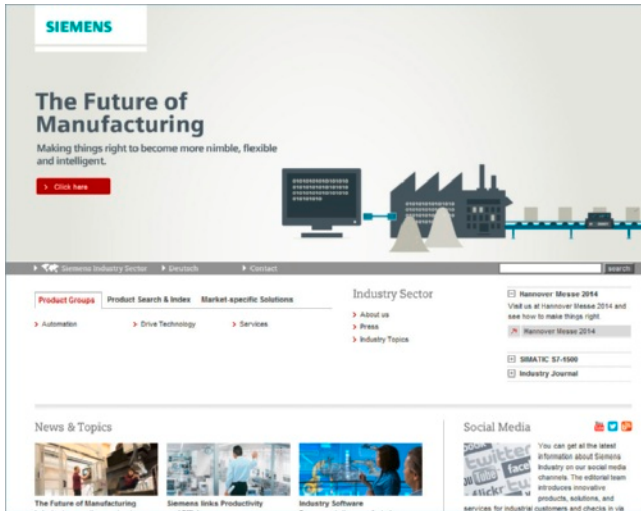


## Appendix

### Online Services

#### Information and Ordering in the Internet and on DVD

##### Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

[www.siemens.com/industry](http://www.siemens.com/industry)

you will find everything you need to know about products, systems and services.

##### Product Selection Using the Interactive Catalog CA 01 of Industry



Detailed information together with convenient interactive functions:

The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

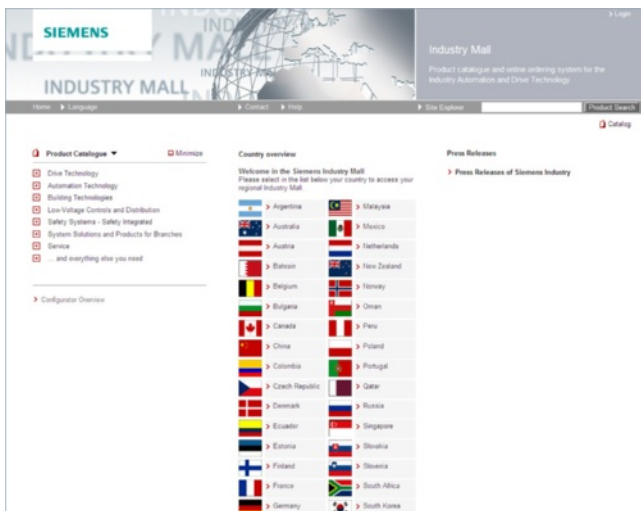
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

[www.siemens.com/automation/ca01](http://www.siemens.com/automation/ca01)

or on DVD.

##### Easy Shopping with the Industry Mall



The Industry Mall is the electronic ordering platform of Siemens AG on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking and tracing of the order to be carried out. Availability checks, customer-specific discounts and preparation of quotes are also possible.

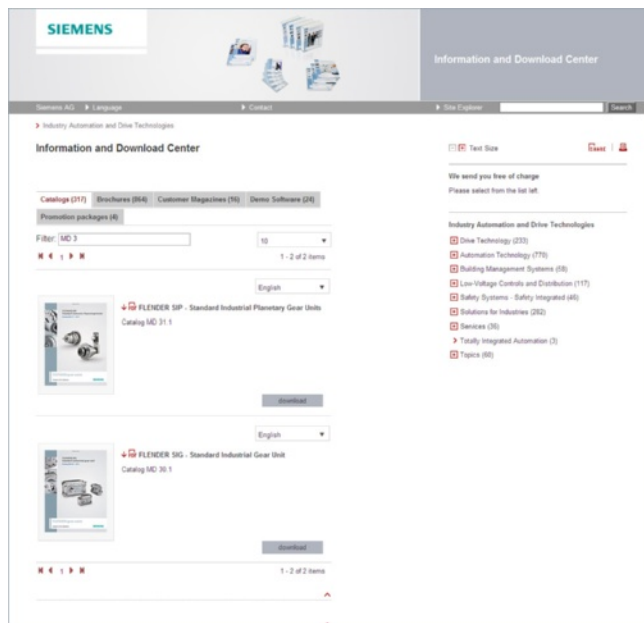
Numerous additional functions are available to support you.

For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

Please visit the Industry Mall on the Internet under:

[www.siemens.com/industrymall](http://www.siemens.com/industrymall)

#### Downloading Catalogs



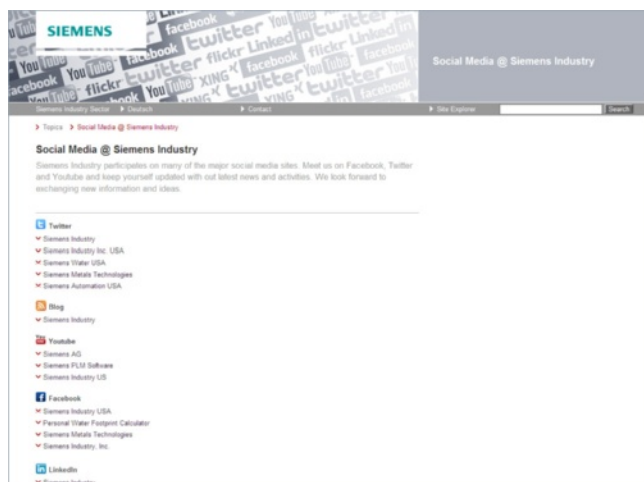
In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "ST 70" both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

[www.siemens.com/industry/infocenter](http://www.siemens.com/industry/infocenter)

#### Social Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

[www.siemens.com/industry/socialmedia](http://www.siemens.com/industry/socialmedia)

Or via our product pages at:

[www.siemens.com/automation](http://www.siemens.com/automation)

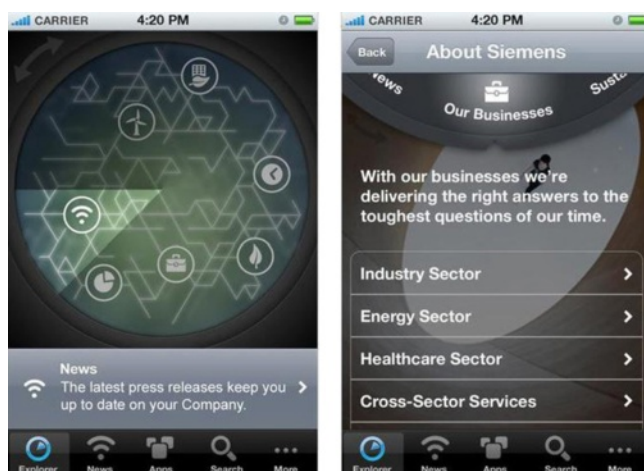
or

[www.siemens.com/drives](http://www.siemens.com/drives)

To find out more about Siemens' current social media activities visit us at:

[www.siemens.com/socialmedia](http://www.siemens.com/socialmedia)

#### Mobile Media



Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.



## Appendix

### Industry Services

Your machines and plant can do more – with Industry Services.



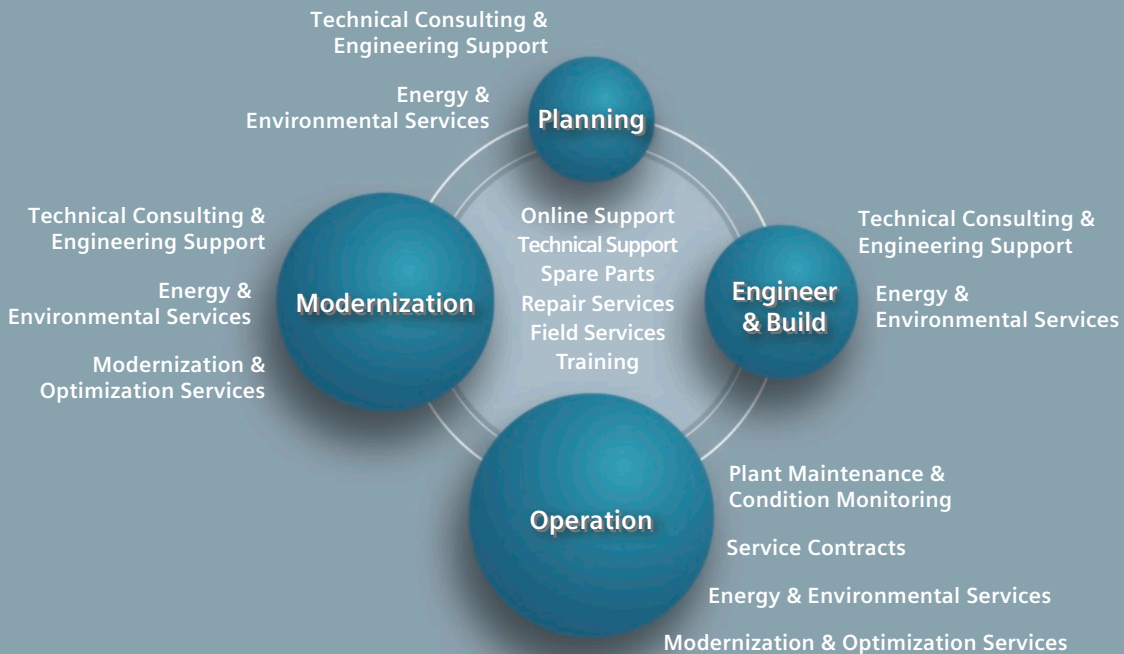
Whether it is production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries.

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio:

[www.siemens.com/industry-services](http://www.siemens.com/industry-services)



G\_DA65\_EN\_00270

Siemens supports its clients with technology based Services across a plants entire life cycle.

### Online Support

Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediated – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.



[www.siemens.com/industry/online-support](http://www.siemens.com/industry/online-support)

### Online Support App



Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products - anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code  
for information on  
our Online Support  
app.

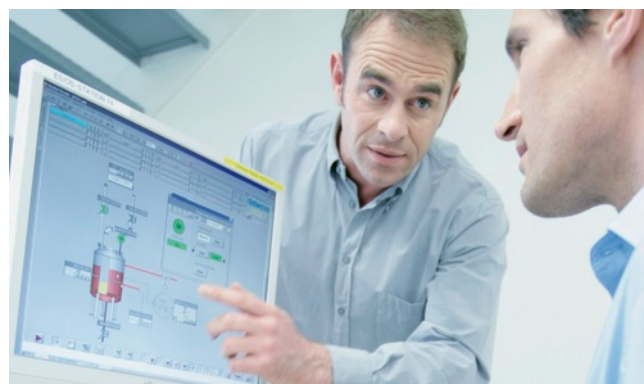


The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

[www.siemens.com/industry/online-supportapp](http://www.siemens.com/industry/online-supportapp)

### Technical Support

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by e-mail, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.



## Appendix

### Industry Services

#### Industry Services for the entire life cycle

##### **Spare Parts**

Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill – and result in substantial financial losses for the operator. The spare parts services from Siemens protect against such losses – with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts service is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.



##### **Repair Services**

Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.



##### **Field Services**

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.





### Training

Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN – Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.



### Technical Consulting & Engineering Support

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.



### Energy & Environmental Services

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.





## Appendix

### Industry Services

#### Industry Services for the entire life cycle

##### **Modernization & Optimization Services**

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation.



##### **Plant Maintenance & Condition Monitoring**

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.



##### **Service Contracts**

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.



## Overview

The information listed here is mainly of a fundamental nature and applies regardless of the type and vendor of the electronic control system.

### Reliability

The reliability of devices and components is being driven as high as possible by employing extensive and cost-effective measures in development and production.

This includes

- Selection of high-quality components;
- Worst-case design calculation of all circuits;
- Systematic and computer-controlled testing of all subcontracted components;
- Burn-in of all large-scale integrated circuits (e.g. processors, memories etc.);
- Measures to prevent static charging when working at or with MOS circuits;
- Visual checks at various stages of production;
- In-circuit testing of all modules, i.e. computer-aided testing of all components and their interaction in the circuit;
- Hot endurance run at high ambient temperature over several days;
- Meticulous computer-controlled final testing;
- Statistical evaluation of all returns for immediate introduction of remedial actions.

These measures are regarded as basic measures in safety engineering. They prevent or keep control of the majority of potential faults.

### Risks

Wherever faults are liable to cause injury to persons or damage to property it is necessary to introduce measures aimed in particular at the safety of the plant and, therefore, of the control system. Special, plan-specific directives exist for these applications and need to be taken into account when configuring the control system.

In the case of safety-relevant electronic control systems the measures needing to be taken to prevent or keep control of faults are aimed at the risk presented by the plant. In such a case the basic measures listed above are no longer sufficient above a certain level of hazard potential. Additional measures have to be implemented and certified (e.g. dual-channel arrangements, tests, checksums etc.) for the control system.

## Division into a safe and a non-safe zone

In practically all plants there are parts which perform safety-related functions (e.g. emergency stop pushbuttons, mesh guards, two-hand controls). In order not to have to consider the complete control system in terms of safety engineering it is customary to divide the control system into a **safe** and a **non-safe** zone. No special requirements are imposed on the safety of the control system in the non-safe zone because there would be no impact on the safety of the plant if the electronics failed in this case. In the safe zone, on the other hand, you are only allowed to use control systems and/or circuits which satisfy the directives in question.

The following zonal divisions are customary in practice:

- Control systems with little safety engineering, e.g. machine control systems.
- Control systems with balanced zones, e.g. chemical plants, aerial ropeways.
- Control systems with mainly safety engineering, e.g. incineration plants.

### Important

Even if a maximum of design-based safety is achieved in the configuration of an electronic control systems – e.g. through multi-edge configuration – it is still essential to closely follow the instructions in the operating manuals as otherwise wrong actions may suspend precautions for preventing potential faults or may create additional sources of danger.

## Appendix

### Software Licenses

#### Overview

##### Software types

Software requiring a license is categorized into types. The following software types have been defined:

- Engineering software
- Runtime software

##### Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third parties free-of-charge.

##### Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

##### License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

##### Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started. A license is required for each concurrent user.

##### Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

##### Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).

One license is required for each installation of the software.

##### Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

##### Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

##### Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

##### Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

##### Certificate of license (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

##### Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

##### Delivery versions

Software is constantly being updated.

The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

##### PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.

A separate PowerPack must be purchased for each original license of the software to be replaced.

**Overview****Upgrade**

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.

The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed. A separate upgrade must be purchased for each original license of the software to be upgraded.

**ServicePack**

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

**License key**

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

**Software Update Service**

The SIMATIC NET Software Update Service includes automatic delivery of the relevant updates of the SIMATIC NET PC software DVD, which is available following the signing of the contract.

The CD contains SIMATIC NET software for Industrial Ethernet, PROFINET, OPC server and PROFIBUS, so that your software is always up to date.

The following boundary conditions apply:

- The customer must already have a current software version, so an update/upgrade may be required beforehand.
- The update service is valid for one year following the date specified in the order.
- It shall be extended automatically for a further year, provided that it is not cancelled 3 months in advance by the customer or by the responsible Siemens partner.

When the contract is extended, the customer will be invoiced for the cost of a further year.

You can download explanations concerning license conditions from [www.siemens.com/automation/salesmaterial-as/catalog/en/terms\\_of\\_trade\\_en.pdf](http://www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf)

## Appendix

### Conditions of sale and delivery

#### 1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

##### 1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"<sup>1)</sup> and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"<sup>1)</sup> and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"<sup>1)</sup>.

##### 1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"<sup>1)</sup> and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"<sup>1)</sup> and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"<sup>1)</sup>.

#### 2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charge the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:

[www.siemens.com/automation/salesmaterial-as/catalog/en/terms\\_of\\_trade\\_en.pdf](http://www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf)

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

#### 3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

#### 4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i .a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

1) The text of the Terms and Conditions of Siemens AG can be downloaded at  
[www.siemens.com/automation/salesmaterial-as/catalog/en/terms\\_of\\_trade\\_en.pdf](http://www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf)



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Catalog

Products for Automation and Drives, Low-Voltage Power Distribution and Electrical Installation Technology **CA 01****Building Control**

GAMMA Building Control ET G1

**Drive Systems**

SINAMICS G130 Drive Converter Chassis Units	D 11
SINAMICS G150 Drive Converter Cabinet Units	
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives Germany Edition	D 15.1
SINAMICS G180 Converters – Compact Units, Cabinet Systems, Cabinet Units Air-Cooled and Liquid-Cooled	D 18.1
SINAMICS S120 Chassis Format Units and Cabinet Modules	D 21.3
SINAMICS S150 Converter Cabinet Units	
SINAMICS DCM DC Converter, Control Module	D 23.1
SINAMICS DCM Cabinet	D 23.2
SINAMICS and Motors for Single-Axis Drives	D 31
SINAMICS G120P and SINAMICS G120P Cabinet pump, fan, compressor converters	D 35
Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN	D 84.1
• Series H-compact	
• Series H-compact PLUS	
Asynchronous Motors Standardline	D 86.1
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2
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SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
<i>Digital: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i>	DA 22
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMODRIVE 611 universal and POSMO	DA 65.4

*Note: Additional catalogs on SIMODRIVE or SINAMICS drive systems and SIMOTICS motors with SINUMERIK and SIMOTION can be found under Motion Control*

Low-Voltage Three-Phase-Motors

SIMOTICS Low-Voltage Motors	D 81.1
SIMOTICS FD Flexible Duty Motors	D 81.8
LOHER Low-Voltage Motors	D 83.1
MOTOX Geared Motors	D 87.1
SIMOGEAR Geared Motors	MD 50.1
SIMOGEAR Gearboxes with adapter	MD 50.11

Mechanical Driving Machines

FLENDER Standard Couplings	MD 10.1
FLENDER High Performance Couplings	MD 10.2
FLENDER SIG Standard industrial gear unit	MD 30.1
FLENDER SIP Standard industrial planetary gear units	MD 31.1

**Process Instrumentation and Analytics**

Field Instruments for Process Automation	FI 01
<i>Digital: SIPART Controllers and Software</i>	MP 31
Products for Weighing Technology	WT 10
<i>Digital: Process Analytical Instruments</i>	PA 01
<i>Digital: Process Analytics, Components for the System Integration</i>	PA 11

*Digital: These catalogs are only available as a PDF.*

**Low-Voltage Power Distribution and  
Electrical Installation Technology**

Catalog

SENTRON · SIVACON · ALPHA Protection, Switching, Measuring and Monitoring Devices, Switchboards and Distribution Systems	LV 10
Standards-Compliant Components for Photovoltaic Plants	LV 11
3WT Air Circuit Breakers up to 4000 A	LV 35
3VT Molded Case Circuit Breakers up to 1600 A	LV 36
<i>Digital: SIVACON System Cubicles, System Lighting and System Air-Conditioning</i>	LV 50
<i>Digital: ALPHA Distribution Systems</i>	LV 51
ALPHA FIX Terminal Blocks	LV 52
SIVACON S4 Power Distribution Boards	LV 56
<i>Digital: SIVACON 8PS Busbar Trunking Systems</i>	LV 70
<i>Digital: DELTA Switches and Socket Outlets</i>	ET D1

**Motion Control**

SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61
SINUMERIK 840D sl Type 1B Equipment for Machine Tools	NC 62
SINUMERIK 808 Equipment for Machine Tools	NC 81.1
SINUMERIK 828 Equipment for Machine Tools	NC 82
SIMOTION, SINAMICS S120 & SIMOTICS Equipment for Production Machines	PM 21
Drive and Control Components for Cranes	CR 1

**Power Supply**

Power supply SITOP	KT 10.1
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**Safety Integrated**

Safety Technology for Factory Automation	SI 10
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**SIMATIC HMI/PC-based Automation**

Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC
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**SIMATIC Ident**

Industrial Identification Systems	ID 10
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**SIMATIC Industrial Automation Systems**

Products for Totally Integrated Automation	ST 70
SIMATIC PCS 7 Process Control System System components	ST PCS 7
SIMATIC PCS 7 Process Control System Technology components	ST PCS 7 T
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7 AO

**SIMATIC NET**

Industrial Communication	IK PI
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**SIRIUS Industrial Controls**

SIRIUS Industrial Controls	IC 10
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